



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/944,985	08/30/2001	Arup Bhattacharyya	1303.023US1	1905
21186	7590	07/23/2004	EXAMINER	
SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A. P.O. BOX 2938 MINNEAPOLIS, MN 55402			TRAN, THIEN F	
			ART UNIT	PAPER NUMBER
			2811	

DATE MAILED: 07/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

8-8

Office Action Summary	Application No. 09/944,985	Applicant(s) BHATTACHARYYA, ARUP	
	Examiner Thien F Tran	Art Unit 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 May 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6,8-61,63-78,80-84 and 117-134 is/are pending in the application.
4a) Of the above claim(s) See Continuation Sheet is/are withdrawn from consideration.
- 5) ☒ Claim(s) 125-127 and 132 is/are allowed.
- 6) ☒ Claim(s) 1,2,4,14,18,19,56,57,59,63,73,74,76,80 and 84 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>05/17/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

Continuation of Disposition of Claims: Claims withdrawn from consideration are 3,5,6,8-13,15-17,20-55,58,60,61,64-72,75,77,78,81-83,117-124,128-131,133 and 134.

DETAILED ACTION***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 05/17/2004 has been entered.

Election/Restrictions

Claims 128-131 and 133-134 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 05/12/2003.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2, 14, 56-57, 63, 73-74, 80 and 84 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimoji et al. (USPN 5,332,915) in view of Bass, Jr. et al. (USPN 4,870,470).

Shimoji et al. discloses a gate stack (Fig. 1) comprising a tunnel medium 5; a high K charge blocking and charge storing medium 4 disposed on the tunnel medium; and a high dielectric film 2 having a specific dielectric constant of at least 10. Bass, Jr. et al. discloses a gate stack (Fig. 6) comprising a high dielectric film 35 of silicon rich nitride (SRN) between a control gate 40 and a high K charge blocking and charge storing medium 30, the high dielectric film 35 of SRN forming an injector medium. SRN is a high dielectric film having a dielectric constant of greater than or equal to 12. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to use SRN as a suitable high dielectric material for the high dielectric film 2 to further provide good charge injecting properties that provide appreciably enhanced charge conductance (see col. 8, lines 5-12 and lines 37-40). As a result, a high dielectric film 2 of SRN is capable of functioning as an injector medium.

Shimoji et al. further discloses a memory cell (Fig. 1) comprising a substrate 5; N+ doped regions that inherently form source and drain regions on opposite sides of the gate stack; and a gate 1 disposed on the gate stack.

Regarding claims 73 and 84, Shimoji et al. in view of Bass, Jr. et al. does not explicitly disclose the memory cell being used in an electronic system comprising a processor and a nonvolatile memory device coupled to the processor, the memory device including an array of memory cells coupled to a grid of row lines and column lines; row select circuitry and column select circuitry wherein the row select circuitry and the column select circuitry cooperate to

Art Unit: 2811

select a memory cell for application of a programming voltage. A processor and a nonvolatile memory device coupled to the processor, the memory device including an array of memory cells coupled to a grid of row lines and column lines; row select circuitry and column select circuitry cooperated to select a memory cell for application of a programming voltage are conventional elements in a conventional electronic system. It would have been obvious to form the memory cell of the modified Shimoji et al. as memory cells in the conventional electronic system having the conventional elements as described above for the advantages that the modified Shimoji et al. provides.

Claims 4, 18-19, 59, 76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimoji et al. (USPN 5,332,915) in view of Bass, Jr. et al. (USPN 4,870,470) as applied to claims 1, 56, 73, 84 above, and further in view of Sadd et al. (USPN 6,444,545).

Shimoji et al. in view of Bass, Jr. et al. as described above does not disclose the tunnel medium 5 including tunnel Al_2O_3 . Al_2O_3 and SiO_2 are dielectric materials known in the art and routinely used as materials for tunnel medium in semiconductor device as shown for example Sadd et al. (col. 2, lines 27-31). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select any one of these materials as a suitable dielectric material for the tunnel medium of the modified Shimoji et al. to provide good FN tunneling electroconductivity, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of

Art Unit: 2811

its suitability for the intended use as a matter of design choice. In re Leshin, 125 USPQ 416.

Regarding claims 18-19, Shimoji et al. and Bass, Jr. et al. does not specifically disclose the high K charge blocking and charge storing medium 4 including nano crystals for providing charge trapping charge centers. Sadd et al. disclose a gate stack (Fig. 8) comprising a charge blocking and charge storing medium 35 including silicon nano crystals 32. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to form the high K charge blocking and charge storing medium 4 including nano crystals as taught by Sadd et al. so that much of the charge would remain in the storage medium 4 due to trapping in the nano crystals. As a result, charge leak off from the medium 4 would be reduced.

Allowable Subject Matter

Claims 125-127 and 132 are allowed.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thien F Tran whose telephone number is (571) 272-1665. The examiner can normally be reached on 8:30AM - 5:00PM Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C Lee can be reached on (571) 272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2811

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

tt
July 21, 2004


THIENTRAN
PRIMARY EXAMINER